# Mother birds 'engineer' their offspring

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Bird species that have relatively long incubation periods and short nestling periods for their body size have higher concentration of androstenedione than those species whose developmental time is shifted towards relatively longer stays in the nest than in the egg. This is an advantage depending on the predators. There is a relationship between egg levels of androstenedione and colony size, suggesting that mothers prepare their offspring for the social conditions.

Current research emphasizes the role of maternal effects in fostering the adaptation of organisms to a changing environment. In birds, mothers pass androgens to their eggs, and these hormones have been shown to influence the development and behavior of nestlings. Since these effects may persist in adulthood, it has been suggested that avian mothers may engineer, so to speak, the adult phenotype of their offspring.

Although abundant research in a variety of species has examined these questions, little is known on whether differences between species in levels of egg androgens are related to differences in the ecology of species.

Diego Gil, from the Spanish Museum of Natural History, and coauthors (Clotilde Biard, André Lacroix, Claire Spottiswoode, Nicola Saino, Marisa Puerta, and Anders P. Møller) from several universities in Europe, show in a paper in the June issue of *The American Naturalist* that several differences in avian life history have coevolved with differences in yolk androgens. Thus, the relative amount of time that a developing bird spends in the egg and in the nest is positively related to

androstenedione, one of the main egg androgens. That is to say, bird species that have relatively long incubation periods and short nestling periods for their body size have higher concentration of androstenedione than those species whose developmental time is shifted towards relatively longer stays in the nest than in the egg.

Another pattern that emerges is a positive relationship between egg levels of androstenedione and colony size, suggesting that mothers prepare their offspring for the social conditions that they will experience as adults. These data provide evidence that facultative maternal effects at the individual level are linked to evolutionary transitions between species, suggesting a role of phenotypic plasticity in supporting adaptative patterns.

Source: University of Chicago